703-305-3230

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SN 10/526,966

Rec'd PCT/PTO 18 OCT 2005

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JUNE 15, 2005

THE PATENT AND TRADEMARK OFFICE OFFICIAL FILING DATE STAMP HEREON IS ACKNOWLEDGEMENT OF FILING:

X	**Preliminary Amendment**		Filing of PCT/AU03/001144
	Request for Reconsideration		Pages of Specification
	Supplemental Amendment		Pages of Claims
	Election Requirement		Abstract of the Disclosure
	IDS w/PTO-1449 (___ Refs)		Pages of Drawings
	Assignment w/PTO-1595		Application Data Sheet
	EOT (__ month(s))		Postcard
	Submsn of Dec/Filing Fees		Copy of WO 04/022920
	Translation of Appln.		Copy of ISR
	Priority Doc#____________		Copy of IPER
	Part B-Issue Fee Transmtl.	X	**Submsn of IPER**

TITLE: **APPARATUS, METHOD AND SOFTWARE FOR USE WITH AN AIR CONDITIONING CYCLE**

INVENTOR: **DRYSDALE et al.**
SERIAL NO: **10/526,966**
DOCKET NO: **66299-030-7**
DATE: **June 15, 2005**
DUE DATE
CLIENT: **BALDWINS**

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JUN 15 2005
PATENT & TRADEMARK OFFICE

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Atty. Docket No. 66299-030-7

Rec'd PCT/PTO 15 JUN 2005 #4

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:

Kenneth W. P. DRYSDALE

Serial No.: 10/526,966

Filed: June 2, 2005

Group Art Unit: Unassigned

Examiner: Not Yet Assigned

For: APPARATUS, METHOD AND SOFTWARE FOR USE WITH AN AIR CONDITIONING CYCLE

PRELIMINARY AMENDMENT

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

June 15, 2005

Sir:

Prior to initial evaluation, please amend this application as follows:

10/18/2005 SAHMED1 00000010 042223 10526966

01 FC:2615 275.00 DA
02 FC:2614 100.00 DA

AMENDMENTS TO THE CLAIMS:

1. (Previously Presented) A thermodynamic cycle including a compressor, a first turbine downstream of the compressor, a heat exchanger located downstream of the first turbine and operable to reject heat from the cycle to another thermodynamic cycle, an evaporator downstream of the heat exchanger and a second turbine downstream of the evaporator and upstream of the compressor.

2. (Previously Presented) A thermodynamic cycle including a compressor, a condenser downstream of the compressor, a first turbine downstream of the condenser, an evaporator downstream of the first turbine and a second turbine downstream of the evaporator and upstream of the compressor.

3. (Previously Presented) The thermodynamic cycle of claim 2 further including a heat exchanger located between said first turbine and said evaporator, the heat exchanger operable to reject heat to another thermodynamic cycle.

4. (Currently Amended) The thermodynamic cycle of ~~any one of claims 1 to 3~~ claim 2, wherein at least one of the first turbine and second turbine includes:
a rotor chamber;
a rotor rotatable about a central axis within said rotor chamber;
at least one nozzle including a nozzle exit for applying a fluid a fluid supply in the thermodynamic cycle to said rotor to thereby drive said rotor and generate power;
at least one exhaust aperture to, in use, exhaust said fluid from said turbine; and
wherein the flow of said fluid from said at least one nozzle exit is

periodically interrupted by at least one flow interrupter means, thereby raising the pressure of said fluid inside said at least one nozzle.

5. (Previously Presented) The thermodynamic cycle of claim 4, wherein the at least one of the first turbine and second turbine includes at least one fluid storage means between said fluid supply and said at least one nozzle.

6. (Previously Presented) The thermodynamic cycle of claim 5, wherein said fluid storage means has a capacity at least equal to a displacement of the compressor.

7. (Currently Amended) The thermodynamic cycle of ~~any one of claims 4 to 6~~claim 4, wherein said at least one flow interrupter means substantially stops the flow of said fluid from said at least one nozzle exit until the pressure inside said at least one nozzle rises to a preselected minimum pressure, which is less than or equal to the pressure of the fluid supply.

8. (Currently Amended) The thermodynamic cycle of ~~any one of claims 4 to 7~~claim 4, wherein in use, said flow of said fluid from said at least one nozzle is interrupted by said at least one interrupter means for a period sufficient to bring said fluid immediately upstream of said at least one outer nozzle substantially to rest.

9. (Currently Amended) The thermodynamic cycle of ~~any one of claims 4 to 8~~claim 4, wherein said rotor has a plurality of channels shaped, positioned and dimensioned to provide a turning moment about said central axis when refrigerant from said at least one nozzle enters said channels.

10. (Currently Amended) The thermodynamic cycle of ~~any one of claims 4 to 9~~claim 4, wherein said rotor is has a plurality of blades shaped, positioned and dimensioned to provide a turning moment about said central axis when refrigerant from said at least one nozzle contacts said blades.

11. (Currently Amended) The thermodynamic cycle of ~~any one of claims 4 to 10~~claim 4, wherein said at least one flow interrupter means includes at least one vane connectable to and moveable with an outer periphery of said rotor and adapted to interrupt the flow of said fluid out of said at least one outer nozzle exit when said at least one vane is substantially adjacent said at least one nozzle exit.

12. (Previously Presented) The thermodynamic cycle of claim 11, wherein said flow interrupter means includes a plurality of said vanes substantially evenly spaced apart around said outer periphery of said rotor.

13. (Currently Amended) The ~~turbine~~ thermodynamic cycle of ~~any one of claims 4 to 12~~claim 4, wherein said at least one nozzle in use supplies said fluid to said rotor at a sonic or supersonic velocity.

14. (Previously Presented) The thermodynamic cycle of claim 13, wherein said at least one exhaust aperture includes diffuser and expander sections to decrease the velocity of said fluid and maintain the pressure of the fluid flow once it has decelerated to a subsonic velocity.

15. (Currently Amended) The thermodynamic cycle of ~~any one of claims 1 to 14~~claim 1, wherein at least one of the first and second turbines includes a rotor including two or more spaced apart rotor windings and a stator including a plurality of stator windings about said

rotor, wherein at least two of said stator windings are connected to a controllable current source, each controllable current source operable to ~~energise~~ energize the stator windings to which it is connected.

16. (Currently Amended) The thermodynamic cycle of claim 15, wherein each controllable current source is operable to ~~energise~~ energize the stator windings to which it is connected after the rotor has reached a predetermined velocity.

17. (Previously Presented) The thermodynamic cycle of claim 16, wherein the predetermined velocity is the terminal velocity for the current operating conditions of the turbine.

18. (Currently Amended) The thermodynamic cycle of ~~any one of claims 15 to 17~~claim 15, wherein each current source increases or decreases the current through their respective stator windings dependent on a measure of the power output from the stator windings.

19. (Currently Amended) A method of control for the thermodynamic cycle claimed in ~~any one of claims 15 to 18~~ claim 15 including repeatedly measuring the power output from the stator windings and increasing the current through the windings if the current measure of power output is greater than a previous measure of power output and decreasing the current through the windings if the current measure of power output is less than a previous measure of power output.

20. (Previously Presented) A method of generating power from a thermodynamic cycle including a compressor, a first turbine downstream of the compressor, a heat exchanger located downstream of the first turbine and operable to reject heat from the cycle to another thermodynamic cycle, an evaporator downstream of the heat exchanger

and a second turbine downstream of the evaporator and upstream of the compressor, wherein the first second turbines include a rotor and at least one nozzle to apply fluid to the rotor to thereby drive said rotor and generate power;
the method including providing at least one flow interrupter means to periodically interrupt the flow of said fluid out of said at least one nozzle, thereby raising the pressure of said fluid inside said at least one nozzle to a preselected minimum pressure which is less or equal to said fluid supply means pressure before resuming the flow of said fluid out of said at least one nozzle.

21. (Previously Presented) A method of generating power from a thermodynamic cycle including a compressor, a condenser downstream of the compressor, a first turbine downstream of the condenser, an evaporator downstream of the first turbine and a second turbine downstream of the evaporator and upstream of the compressor wherein the first second turbines include a rotor and at least one nozzle to apply fluid to the rotor to thereby drive said rotor and generate power;
the method including providing at least one flow interrupter means to periodically interrupt the flow of said fluid out of said at least one nozzle, thereby raising the pressure of said fluid inside said at least one nozzle to a preselected minimum pressure which is less or equal to said fluid supply means pressure before resuming the flow of said fluid out of said at least one nozzle.

22. (Currently Amended) The method of ~~claim 20 or~~ claim 21, wherein said preselected minimum pressure is sufficient to cause the fluid to reach the local sonic velocity at a throat of the nozzle.

23. (Previously Presented) The method of claim 22, including accelerating fluid exiting said at least one nozzle to supersonic velocities.

24. (Currently Amended) A control system for the thermodynamic cycle claimed in ~~any one of claims 1 to 18~~claim 1, the control system including:
sensing means for providing a measure of an output of the thermodynamic cycle;
control means for the compressor, wherein the control means is in communication with said sensing means to receive as inputs said measure of an output of the thermodynamic cycle and a measure of the work input of the compressor; and
wherein the control means is operable to compute a measure of efficiency from said inputs and vary the speed of the compressor to maximise said measure of efficiency or to maintain said measure of efficiency at a predetermined level.

25. (Previously Presented) The control system of claim 24, further including second control means for the second turbine and sensing means for providing a measure of the temperature of a controlled area, wherein the second control means receives as a further input said measure of the temperature of a controlled area, and is operable to open or close the fluid flow path through said second turbine in response to sensed variations in temperature in the controlled area in relation to a target measure.

26. (Currently Amended) The control system of claim 24 ~~or claim 25~~, wherein the second control means further receives as an input a measure indicative of the amount of refrigerant in the cycle which is vaporised after an evaporation phase in the cycle and to open or close the fluid flow path through said second turbine to maintain ~~vaporised~~

vaporized refrigerant after the evaporation phase.

27. (Currently Amended) The control system of ~~any one of claims 24 to 26~~claim 24, wherein the operation of the second control means to maintain vaporised refrigerant after the evaporation phase is performed after a predetermined delay from the control means opening or closing the fluid flow path through said second turbine in response to said sensed variations of temperature.

28. (Currently Amended) The control system of ~~any one of claims 24 to 27~~ claim 24 including third control means for a condenser in the thermodynamic cycle, the control system varying the operation of the condenser to maintain a required level of cooling of refrigerant by the condenser.

29. (Previously Presented) The control system of claim 28, wherein the control means, second control means and third control means is a single microcontroller or microprocessor or a plurality of microcontrollers or microprocessors with at least selected microcontrollers or microprocessors in communication with each other to allow management of the timing of the functions of the control system.

30. (Currently Amended) A control system for the thermodynamic cycle claimed in ~~any one of claims 15 to 17~~claim 15, the control system including:
sensing means for providing a measure of an output of the thermodynamic cycle;
control means for the compressor, wherein the control means is in communication with said sensing means to receive as inputs said measure of an output of the thermodynamic cycle and a measure of the work input of the compressor; and

wherein the control means is operable to compute a measure of efficiency from said inputs and vary the speed of the compressor to maximise said measure of efficiency or to maintain said measure of efficiency at a predetermined level and wherein the control system is operable to control the direct current through the stator windings of said turbine.

31. (Currently Amended) The control system of claim 30, operable to control the direct current through the stator windings to dynamically maintain the balance of said turbine when loaded.

REMARKS

By this Preliminary Amendment claims 4, 7-11, 13, 15, 16, 18, 19, 22, 24, 26-28, 30 and 31 have been amended to better comply with U.S. practice.

Also attached is a supplemental page 35 for the application containing an abstract of the disclosure.

Respectfully submitted,

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ABSTRACT OF THE DISCLOSURE

A turbine for generating power has a rotor chamber, a rotor rotatable about a central axis within the rotor chamber, and at least one nozzle for supplying a fluid from a fluid supply to the rotor to thereby drive the rotor and generate power. The flow of the fluid from the nozzle exist is periodically interrupted by at least one flow interrupter means, thereby raising a pressure of the fluid inside the nozzle. A thermodynamic cycle is also disclosed including a compressor, a first turbine downstream of the compressor, a heat exchanger located downstream of the first turbine and operable to reject heat from the cycle to another thermodynamic cycle, an evaporator downstream of the heat exchanger and a second turbine downstream of the evaporator and upstream of the compressor.

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